

**U.S. FISH AND WILDLIFE SERVICE
SPECIES ASSESSMENT AND LISTING PRIORITY ASSIGNMENT FORM**

SCIENTIFIC NAME: *Partula langfordi*

COMMON NAME: Langford's tree snail; akaleha

LEAD REGION: Region 1

INFORMATION CURRENT AS OF: April 2010

STATUS/ACTION

☐ Species assessment - determined we do not have sufficient information on file to support a proposal to list the species and, therefore, it was not elevated to Candidate status

☐ New candidate

☒ Continuing candidate

☐ Non-petitioned

☒ Petitioned - Date petition received: May 11, 2004

☐ 90-day positive - FR date:

☒ 12-month warranted but precluded - FR date: May 11, 2005

☐ Did the petition request a reclassification of a listed species?

FOR PETITIONED CANDIDATE SPECIES:

a. Is listing warranted (if yes, see summary of threats below)? Yes

b. To date, has publication of a proposal to list been precluded by other higher priority listing actions? Yes

c. If the answer to a. and b. is "yes", provide an explanation of why the action is precluded.

Higher priority listing actions, including court-approved settlements, court-ordered and statutory deadlines for petition findings and listing determinations, emergency listing determinations, and responses to litigation, continue to preclude the proposed and final listing rules for the species. We continue to monitor populations and will change its status or implement an emergency listing if necessary. The "Progress on Revising the Lists" section of the current CNOR (<http://endangered.fws.gov/>) provides information on listing actions taken during the last 12 months.

☐ Listing priority change

Former LP: ☐

New LP: ☐

Date when the species first became a Candidate (as currently defined): November 15, 1994

☐ Candidate removal: Former LPN: ☐

☐ A – Taxon is more abundant or widespread than previously believed or not subject to the degree of threats sufficient to warrant issuance of a proposed listing or

continuance of candidate status.

- ___ U – Taxon not subject to the degree of threats sufficient to warrant issuance of a proposed listing or continuance of candidate status due, in part or totally, to conservation efforts that remove or reduce the threats to the species.
- ___ F – Range is no longer a U.S. territory.
- ___ I – Insufficient information exists on biological vulnerability and threats to support listing.
- ___ M – Taxon mistakenly included in past notice of review.
- ___ N – Taxon does not meet the Act’s definition of “species.”
- ___ X – Taxon believed to be extinct.

ANIMAL/PLANT GROUP AND FAMILY: Snails; Family Partulidae (snail)

HISTORICAL STATES/TERRITORIES/COUNTRIES OF OCCURRENCE: Commonwealth of the Northern Mariana Islands (CNMI) (Aguiguan; also known as Agujuan or Goat Island)

CURRENT STATES/COUNTIES/TERRITORIES/COUNTRIES OF OCCURRENCE: Commonwealth of the Northern Mariana Islands (Aguiguan)

LAND OWNERSHIP: The island of Aguiguan is owned by the Commonwealth of the Northern Mariana Islands.

LEAD REGION CONTACT: Linda Belluomini, (503) 231-6283, linda_belluomini@fws.gov

LEAD FIELD OFFICE CONTACT: Pacific Islands Fish & Wildlife Office, Christa Russell (808) 792-9400, christa_russell@fws.gov

BIOLOGICAL INFORMATION

Species Description

Langford’s tree snail (*Partula langfordi*) has a dextral shell described by Kondo (1970) as being ovate-conic and moderately thin. It has a spire of five whorls that are slightly convex, with an obtuse apex. Its aperture is oblong-ovate with the white peristome thickened and expanded. Its background is buff colored superimposed by maroon. A band on whorls two and three is also maroon. The band begins at whorl one and a half as a faint brown marking one-third the width of the whorl and gradually widens to one-half width of the whorl and deepens to maroon at whorl three. The band expands to three-fourths width of whorl four and dissipates into a vague blend of buff-maroon at the beginning of whorl five to the end of the shell. The holotype of this species has a length of 0.55 inch (in) (14.0 millimeters (mm)), a diameter of .35 in (9 mm), and a aperture length of 0.31in (8 mm) (Kondo 1970).

Taxonomy

The genus *Partula* has four species found only in the Mariana Islands, and 94 additional species recorded from other Pacific islands (Cowie 1992). Langford’s tree snail (*Partula langfordi*) was first collected and described by Kondo while working on biological control agents in the early

1950s (Kondo 1970). Kondo's 1970 taxonomic work is the most recent and accepted taxonomy for this species.

Habitat/Life History

The biology of the partulid tree snails of the Mariana Islands has not been studied in detail. However, general information on the biology of closely related partulid tree snails has been published and reviewed by Cowie (1992) and the biology of all these species is very similar. As with all terrestrial pulmonate snails, the Mariana Islands tree snails are hermaphroditic. In general, partulid snails begin reproducing in less than 12 months and may live up to 5 years. Up to 18 young are produced each year and some species may be self-fertile. While most terrestrial snails lay eggs, the partulid tree snails give birth to live young. The snails are generally nocturnal, living on bushes or trees and feeding primarily on senescent or decaying plant material. There are no known natural predators of these snails, although many of these species are currently threatened by alien predators (Cowie 1992).

The Langford's tree snail prefers cool, shaded forest habitats (Smith 1995) with high humidity and reduced air movement that might otherwise promote excessive water loss. Crampton (1925) described the habitat requirements of the partulid tree snails of the Mariana Islands as, "a sufficiently high and dense growth to provide shade, to conserve moisture, and to effect the production of a rich humus. Hence the limits to the areas occupied by Partulae are set by the more ultimate ecological conditions which determine the distribution of suitable vegetation." Crampton (1925) further described the intact structure of native Mariana forests as having four general levels: high trees; shrubs and *Pandanus*; cycads and taller ferns; and succulent herbs. He noted that the Mariana Islands partulid tree snails preferentially live on subcanopy vegetation and do not use the high canopy trees (Crampton 1925). In 1994, the International Union for Conservation of Nature and Natural Resources- The World Conservation Union's Species Survival Committee Mollusc Specialist Group, Captive Breeding Specialist Group and Pacific Island Land Snail Group held a three day symposium to draft an Action Plan for the Conservation of the Family Partulidae. They determined that the potential range by ecographic zonation for Langford's tree snail was less than 4 square miles (10 square kilometers). They were unable to estimate the area that was considered occupied by the snail (Pearce-Kelly *et al.* 1994).

Historical Range/Distribution

The three genera and 126 tree snail species of the family Partulidae are restricted to the high islands (not atolls) of the Pacific, excluding the Hawaiian Islands (Kondo 1970, Cowie 1992, and Paulay 1994). The Mariana archipelago historically supported five species of partulid tree snails, and represents the northwestern limit of the geographical range of the Partulidae (Kondo 1970).

The Langford's tree snail is only known from the small island of Aguiguan where it occurs sympatrically with the humped tree snail (*Partula gibba*) (Kondo 1970).

Current Range/Distribution

The Langford's tree snail is only known from the island of Aguiguan in the Commonwealth of the Northern Mariana Islands (Cowie 1992). During a survey conducted in November 2006, no live Langford's tree snails were found (S. Igisomar, Director, CNMI Division of Fish and

Wildlife, *in litt.* 2008).

Population Estimates/Status

Langford's tree snail was collected from an area where it occurred sympatrically with the humped tree snail (Kondo 1970). The mixed populations were not uniformly distributed, but occurred in small colonies with large unoccupied areas between the colonies. In five of the sites, Langford's tree snail outnumbered the humped tree snail and it appeared that humped tree snails were more numerous and dominant in the western portion of the site while Langford's tree snails were dominant in the eastern portion of the site (Kondo 1970). Three other colonies of Langford's tree snail were collected, two on the north coast and one on the west end of Aguiguan (Kondo 1970). A total of 464 adults were collected from seven sites (Kondo 1970). In 1985, five adult Langford's tree snails were collected from the west end of the island (Smith 1995). The last survey, in which the species was detected in the wild, was done in 1992, and one live snail was observed on the northwest terrace of the island (Smith 1995). Currently, this is the only known individual of this species in the wild. In 1993, Nottingham University had 6 young and 4 adult Langford's tree snail in captivity. In 1994, they had a total of two adults. Unfortunately, at the end of 1994, Nottingham University's last two Langford's tree snails died (Pearce-Kelly *et al.* 1995).

THREATS

A. The present or threatened destruction, modification, or curtailment of its habitat or range.

In the 1930s, the island of Aguiguan was mostly cleared of native forest to support sugar cane and pineapple production. The abandoned fields and airstrip are now over grown with alien weeds. The remaining native forest understory has greatly suffered from large and uncontrolled populations of alien goats (*Capra hircus*) and the invasion of weeds (Engbring *et al.* 1986).

Cruz *et al.* (2003), observed a forest limited in native species with a bare understory and low seedling recruitment, due to browsing by feral goats. The most disturbed areas are now dominated by *Lantana camara* (West Indian lantana), which is invading the upper reaches of the island and in open field regions leaving no room for native species recruitment (Cruz *et al.* 2003).

B. Overutilization for commercial, recreational, scientific, or educational purposes.

Overutilization is not known to be a factor currently affecting any of the partulid tree snails from the Mariana Islands. Future overutilization of this species is not anticipated.

C. Disease or predation.

Predation by the alien rosy carnivore snail (*Euglandina rosea*) and the alien Manokwar flatworm (*Platydemus manokwari*) is a serious threat to the survival of all four species of partulid tree snails from the Mariana Islands. The predatory rosy carnivore snail is native to the southeastern United States, and was introduced into the Mariana Islands in 1957 by the governments of Guam and the Commonwealth of the Northern Mariana Islands as a biocontrol agent (Eldredge 1988).

The rosy carnivore snail readily feeds on native Pacific island tree snails, including the Partulidae (Tillier and Clarke 1983; Murray *et al.* 1988; Miller 1993) and the Hawaiian

achatinellid tree snails (Hadfield *et al.* 1993). A study of the diet of the rosy carnivore snail on the island of Mauritius in the Indian Ocean showed that this alien predator preferred native snails over the targeted alien giant African snail (*Achatina fulica*) (Griffiths *et al.* 1993). The rosy carnivore snail represents a significant threat to the survival of native Mariana Islands snails, including Langford's tree snail.

Predation on native partulid tree snails by the terrestrial Manokwar flatworm is also a threat to the long-term survival of these snails. This voracious snail predator was introduced into Guam in 1978 and has been spread by humans throughout the main Mariana Islands (Eldredge 1988). The Manokwar flatworm has also contributed to the decline of native tree snails, due to its ability to ascend into trees and bushes that support native snails. Areas with populations of the flatworm usually lack partulid tree snails or have declining numbers of snails (Hopper and Smith 1992). In 1992 a survey was conducted during which one Langford's tree snail was observed on the leaves of a *Guamia mariannae* (Pai-Pai) plant about 9 feet (3 meters) above the ground. The shells of dead Langford's tree snails and humped tree snails "littered the ground" (Smith 1995). In addition, a "dense aggregation" of the Manokwar flatworm was also found in the same area (Smith 1995).

D. The inadequacy of existing regulatory mechanisms.

Currently, no formal or informal protection is given to the Langford's tree snail.

E. Other natural or manmade factors affecting its continued existence.

Small populations are particularly vulnerable to reduced reproductive vigor caused by inbreeding depression, and they may suffer a loss of genetic variability over time due to random genetic drift, resulting in decreased evolutionary potential and ability to cope with environmental change (Lande 1988; Pimm *et al.* 1988; Center for Conservation Update 1994; Mangel and Tier 1994). Randomly occurring natural events such as typhoons and droughts could eliminate the only known population of *Partula langfordi*. This is especially true due to several life-history features of this and all other partulid tree snails (Cowie 1992). Reproductive rates are lower than most terrestrial snails as tree snails do not lay large numbers of eggs but bear one to two live young, which means lower numbers of individuals are added to the population and dispersal is very limited with most individuals remaining in the tree or bush into which they were born. All of these traits make these snails very sensitive to any randomly occurring natural events such as typhoons and storms that could lead to a reduction or loss of reproductive individuals.

CONSERVATION MEASURES PLANNED OR IMPLEMENTED

A survey trip to Aguiguan was conducted in November 2006 and no live Langford's tree snails were found (S. Igisomar, *in litt.* 2008).

SUMMARY OF THREATS

Based on our evaluation of habitat degradation and loss by feral goats and nonnative plants, and the effects of predation by nonnative snails and flatworms, and vulnerability to randomly occurring natural events, we conclude there is sufficient information to develop a proposed rule for this species due to the low number of individuals, degradation of its habitat, and the threat of predation by nonnative snails and flatworms. In addition, Langford's tree snail is vulnerable to randomly occurring natural events such as typhoons and storms. We find that this species is

warranted for listing throughout all its range, and, therefore, find that it is unnecessary to analyze whether it is threatened or endangered in a significant portion of its range.

For species that are being removed from candidate status:

___ Is the removal based in whole or in part on one or more individual conservation efforts that you determined met the standards in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (PECE)?

RECOMMENDED CONSERVATION MEASURES

- Conduct extensive surveys for Langford's tree snail
- Develop and implement nonnative snail removal and control program
- Develop and implement nonnative flatworm removal and control program
- Develop and implement feral goat removal and control program
- Develop and implement habitat restoration program
- Expand and reinvigorate captive propagation program

LISTING PRIORITY

THREAT			
Magnitude	Immediacy	Taxonomy	Priority
High	Imminent	Monotypic genus	1
		Species	2*
	Non-imminent	Subspecies/population	3
		Monotypic genus	4
		Species	5
Moderate to Low	Imminent	Subspecies/population	6
		Monotypic genus	7
		Species	8
	Non-imminent	Subspecies/population	9
		Monotypic genus	10
		Species	11
		Subspecies/population	12

Rationale for listing priority number:

Magnitude:

The threats to Langford's tree snail from habitat destruction and modification by goats and invasive nonnative plants, and by predation from nonnative predatory snails and flatworms are of high magnitude. These threats occur throughout the range of Langford's tree snail. Currently

there are no efforts in place to control or eradicate nonnative predatory snails or flatworms, or to stop the loss and degradation of habitat by feral goats and nonnative plants. These threats occur range-wide.

Immediacy of Threats:

The primary threats to this species from habitat degradation and loss from feral goats and nonnative plants, and predation by nonnative predatory snails and flatworms are imminent because they are ongoing.

Rationale for Change in Listing Priority Number (insert if appropriate)

Yes Have you promptly reviewed all of the information received regarding the species for the purpose of determining whether emergency listing is needed?

Is Emergency Listing Warranted?

No. The species does not appear to be appropriate for emergency listing at this time because the immediacy of the threats is not so great as to imperil a significant proportion of the taxon within the time frame of the routine listing process. If it becomes apparent that the routine listing process is not sufficient to prevent large losses that may result in this species' extinction, then the emergency rule process for this species will be initiated. We will continue to monitor the status of Langford's tree snail as new information becomes available. This review will determine if a change in status is warranted, including the need to make prompt use of emergency listing procedures.

DESCRIPTION OF MONITORING

We conducted literature searches for recent articles on this species and contacted the Commonwealth of the Northern Mariana Islands (CNMI) Division of Fish and Wildlife regarding the current status of this species. New information on the species' status was provided and incorporated into this assessment.

This level of monitoring is appropriate to update the status of the species because a thorough literature search was conducted. Information contained in this assessment form was verified and any updated information incorporated.

List of Experts Contacted:

Name	Date	Affiliation
Sylvan O. Igisomar	January 29, 2010	CNMI Division of Fish and Wildlife, Saipan

This species is listed as critically endangered (CR) in the International Union for Conservation of Nature and Natural Resources (IUCN) Red Data List database (IUCN 2006). Langford's tree snail is included in the list of species in the Commonwealth of the Northern Mariana Islands' 2005 Comprehensive Wildlife Conservation Strategy (Berger *et al.* 2005).

COORDINATION WITH STATES

On January 29, 2010, we sent a letter to CNMI Division of Fish and Wildlife requesting their review and comment on our most recent candidate assessment of this species. No response was received.

LITERATURE CITED

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- Lande, R. 1988. Demographic models of the northern spotted owl (*Strix occidentalis caurina*). *Oecologia* 75: 601-607.
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- Paulay, G. 1994. Biodiversity on oceanic islands: Its origin and extinction. *Am. Zoologist* 34:134-144.
- Pearce-Kelly, P., D. Clarke, and G. Mace. 1994. *Partula '94: an action plan for the conservation of the family Partulidae*. Zoological Society of London. 227pp.
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Personal Communications

- Igisomar, S.O. CNMI Division of Fish and Wildlife, Letter regarding CNMI's response to request for information on candidate assessment forms. February 27, 2008.

APPROVAL/CONCURRENCE: Lead Regions must obtain written concurrence from all other Regions within the range of the species before recommending changes, including elevations or removals from candidate status and listing priority changes; the Regional Director must approve all such recommendations. The Director must concur on all resubmitted 12-month petition findings, additions or removal of species from candidate status, and listing priority changes.

Approve:

Acting Carolyn D. Bohan 5/18/10
Regional Director, Region 1, Fish and Wildlife Service Date

Ronan W. Gould
ACTING
Director, Fish and Wildlife Service October 22, 2010

Concur:

Do not concur: _____
Director, Fish and Wildlife Service Date

Director's Remarks:

Date of annual review: April 16, 2010
Conducted by: Lorena Wada, Pacific Islands FWO
Biologist, Prelisting and Listing Program

Comments:
PIFWO Review

Reviewed by: Christa Russell Date: April 23, 2010
Prelisting and Listing Program Coordinator

Marilet Zablan Date: April 26, 2010
Assistant Field Supervisor, Endangered Species Division

Gina Shultz Date: April 30, 2010
Acting Field Supervisor